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GLOBAL CONNECTIVITY AND GOVERNMENT CAPACITY: SOCIAL NETWORKS, ORDER, CHANGE, AND CONFLICT

by

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Information and communication technologies (ICT), like all technologies, are catalysts for political change and potential conflict. The "Internet effect" continues to fuel the explosive growth of ICT, and has enduring implications. It has sparked the long fuse of an Information Revolution—and a Social Network Revolution. This revolutionary wave is fundamentally altering both the structure of institutional arrangements and the behavior of bureaucratic organizations by transforming traditional tactics for organizing, communicating, collaborating, and participating in the political system. Does the accelerated rate of systemic change caused by the Internet effect create social cohesion, or cleavages that may lead to increased conflict? The purpose of this study is to determine, by qualitative as well as quantitative means, whether a causal relationship exists between the degree a society is connected via social media networks (Internet and the World Wide Web [WWW]) and the institutional capacities of central governance. Blending theory with data, a statistical regression model is developed to evaluate the degree and measure the magnitude of this relationship. The findings gleaned from this analysis suggest that a conditional causal relationship does exist between social connectivity and state capacity.

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GLOBAL CONNECTIVITY AND GOVERNMENT CAPACITY: SOCIAL NETWORKS, ORDER, CHANGE, AND CONFLICT

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ABSTRACT

Information and communication technologies (ICT), like all technologies, are catalysts for political change and potential conflict. The "Internet effect" continues to fuel the explosive growth of ICT, and has enduring implications. It has sparked the long fuse of an Information Revolution—and a Social Network Revolution. This revolutionary wave is fundamentally altering both the structure of institutional arrangements and the behavior of bureaucratic organizations by transforming traditional tactics for organizing, communicating, collaborating, and participating in the political system. Does the accelerated rate of systemic change caused by the Internet effect create social cohesion, or cleavages that may lead to increased conflict? The purpose of this study is to determine, by qualitative as well as quantitative means, whether a causal relationship exists between the degree a society is connected via social media networks (Internet and the World Wide Web [WWW]) and the institutional capacities of central governance. Blending theory with data, a statistical regression model is developed to evaluate the degree and measure the magnitude of this relationship. The findings gleaned from this analysis suggest that a conditional causal relationship does exist between social connectivity and state capacity.

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LIST OF ACRONYMS AND ABBREVIATIONS

ELF	Ethno-Linguistic Fractionalization
ERF	Ethno-Religious Fractionalization
ESTSIMP	Estimates the Model and Simulates its Parameters
FGLS	Feasible General Least-Square
GDP	Gross Domestic Product
ICT	Information Communication Technology
ITU	International Telecommunications Union
OLS	Ordinary Least-Square
PCSC	Panel-Corrected Standard Error
TSCS	Time-Series Cross-Section
WWW	World Wide Web
XTPCSE	Cross (X)-Time Panel-Corrected Standard Error

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This thesis is dedicated to the loving memory of William E. Cunningham, a husband, a father, and an adventurer in creativity to the far depths of the human mind. The thirst for knowledge and meaning derived from the wellspring of your wisdom and intellect in such an evanescent life could never be quenched. Sometimes the complexities and exigencies in life can be overwhelming, but the enduring human spirit—just like an idea—never perishes. He is the true inspiration that has guided my incredible journey through life in the quest for truth, knowledge, and understanding. The manifestation of his thriving spirit endures within the following pages of this manuscript.

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Godspeed and god bless.

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I. INTRODUCTION

A mentor once casually stated during a lecture that with every new technology, a new political sociology is created and perpetuated. In the 21st century era of globalism, a new electronic sociology forged by digital network relationships has emerged in its own virtual spatial commons made up of data, bits, and bytes. Such affordable technology continues to instantly bring the world together in the palm of one's hand in milliseconds as well as nanoseconds with readily accessible intellectual resources, knowledge, and tools necessary for modern innovation and rapid adaptation. As the virtual social space meshes with the geographic political space, it creates dynamic tension that places stress on political structures that comprise a value-coordinated and orientated social system. It has compelled academics and policymakers alike to study the expanding phenomenon of the "Internet effect" and reevaluate the role of technology—specifically information and communication technologies (ICT)—on the complex of institutional arrangements that serve as the central organs of both state and society.

The purpose of this thesis is to answer one scientific question: *Does a causal relationship exist between the degree a society is connected via social media and digital communication networks (Internet and the World Wide Web [WWW]), and the institutional capacity of state governance?* Attempting to quantitatively answer this question within the empirical dimensions of capacity measured by tax collection as a function of connectivity measured by public access to social media over time is an endeavor to understand and explain the role information and communication technologies play in either the growth or decay of a regime's institutional efficiency. Specifically, the maximization in addition to the realization of the state's ability to project aggregate strength, to impose will, and to exert influence required in a constant struggle to retain its political authority, sustain its legitimacy, and maintain its sovereignty.

My initial hypothesis posits that, as a liberal society becomes more connected to the Internet over time, the regime develops growing institutional capacity. Conversely, as a society under authoritarian rule becomes more connected to the Internet over time, the regime experiences decay in its institutional capacity to govern. Paradoxically,

information and communication technologies that have generated progressive modernization and social development may also facilitate the concentration of power and political resources. Yet ICT have also simultaneously generated transformation by accelerating the dispersion of power deepening the competition for political resources. There is an abundance of theoretical literature, coupled with empirical data, to suggest that the role of technology is double-edged; historically, it has and continues to disintegrate crosscutting structural lines of polity that delineate the bounds of institutions of power.

The methodology that I will employ in this thesis will be a blending of theoretical and empirical analysis. By design, this methodological approach serves to mutually reinforce and refine the dimensions of a functional, practical model that represents the cornerstone of this study. The theoretical analysis is a comprehensive study of key bodies of knowledge that explore the areas of organizational behavior, design theory, and political sociology. These specific bodies of literature are to be further discussed in a later section in detail. The focus of this thesis will be concentrated on the empirical analysis of compiled statistical data of both liberal and authoritarian regime types. This analysis will consist of the collection, interpretation, and evaluation of data that measures the capacity of a regime to collect a percentage or ratio of national taxable revenue proportionate to its socioeconomic development. It will also consist of the collection, interpretation, and objective evaluation of data that measures the degree or level of public access to the Internet by the given population of a particular regime type. A correlational analysis will then be applied to the dependent variable (state capacity) in conjunction with the independent variable (social connectivity via Internet) to analyze the significance of the causal effect on governance.

This study aims to make a contribution to the evolving literature pertaining to the role of technology and how it affects the efficacy of governance. An analysis of the empirical data will determine whether strong corollary evidence and significant findings would suggest that a causal relationship exists between state capacity and social connectivity. The scope and relevance of this proposed study has implications that extend well beyond the model designed around the theoretical framework and empirical data

used to substantiate or negate this proposed claim. Moreover, it is to illuminate for academics and policymakers how the role of information and communication technologies serve as actual or potential catalysts that transform or modernize liberal and authoritarian regime types; and their ability to cope by means of liberal toleration or traditional repression with the disruptive changes imposed by innovative technologies on the social system.

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II. LITERATURE REVIEW

The significance of a causal relationship between state capacity and social connectivity could not be more relevant in a modern era of globalism that is testing the efficiency of institutions that exercise power, will, and influence. Although the role of information and communication technologies (ICT) in terms of unique technological innovations may evolve through time, their profound impact on social dynamics, institutional structures, and bureaucratic organizations is as integral as the liberal tradition of social science. The advent of modern mass communication platforms such as the Internet, coupled with instant access to social network information highways such as the World Wide Web (WWW), are emergent social phenomena that have linked billions around the globe in just the past two decades. Although many perceive these phenomena to pose unprecedented complex problems in the present, there are volumes in abundance of historical, theoretical, and empirical literature in the fields of organizational behavior as well as political sociology written over the past century to suggest otherwise. The following section provides a series of brief synopses of various approaches and methods authors have applied to elucidate the social forces and human behavior affecting the transformation and modernization of the state as well as the society.

More than a century ago Max Weber dedicated his life to academia in a quest to develop the structural-functional system. He was "absorbed in problems of the structural peculiarities of modern Western society, of the conditions on which it was dependent, and of its stability and tendencies of change."[1] It was "precisely in its differences from other social systems, in its alterations during its development, and in its possible alterations in the future, as an institutionally organized system of action, that Weber was interested."[2] The system he envisaged is a fusion of typological categories of rational ideals combined with conceptual models designed to capture the dynamical socioeconomic forces, movements, and behavior that propel institutions of power, and

1. Talcott Parsons, ed., *Introduction to Max Weber: The Theory of Social and Economic Organization* (New York: The Free Press, 1947), 24.

2. Ibid., 24–25.

compel institutional reform and change. Talcott Parsons' translation to English and interpretation of the original German manuscripts lucidly expresses the necessity of Weber's rational ideal types:

> The necessity of structural categories in the other type of [analytical] theory is an indication that the dynamic problems are too complex to admit of determinate solution without them, because there are too many variables involved, or because their nature and logical interrelations are not adequately known or are such as not to admit of the application of the requisite mathematical techniques of manipulation.[3]

Considered to be the father of modern political sociology, Weber's work has provided much of the modern conceptual architecture for explaining complex socioeconomic problems.

One scholar who expanded upon Weber's rational ideal types and fine-tuned the structural-functional relationships with a combination of comparative historical and theoretical models was Samuel P. Huntington. The focus of his thesis deals with the transformative impact of socioeconomic forces of change on social systems and political structures. Specifically, it concerns the implications of social mobilization and economic modernization on the rate of growth or decay of political power and order. The scope of Huntington's main thesis argument postulates that:

> Social and economic change—urbanization, increases in literacy and education, industrialization, mass media expansion—extend political consciousness, multiply political demands, broaden political participation. These changes undermine traditional sources of political authority and traditional political institutions; they enormously complicate the problems of creating new bases of political association and new political institutions combining legitimacy and effectiveness. The rates of social mobilization and the expansion of political participation are high; the rates of political organization and institutionalization are low. The result is political instability and disorder. The primary problem of politics is the lag in the development of political institutions behind social and economic change.[4]

3. Ibid., 24.

4. Samuel P. Huntington, *Political Order in Changing Societies* (New Haven: Yale University Press, 1968), 5.

From a historical context, this work was written during the post-World War II era of post-European imperialism and neocolonial nationalism. At the time, Huntington was fixated on the emergence of second world absolutist, statist, and populist regimes budding up in Africa, Asia, and Latin America. As mentioned, his peculiar obsession was with the ever multiplying demands and complexities inherent to the social system, to include the ever increasing pressures and tensions placed on its state structure by liberal participation as well as political institutionalization. Perhaps the most prevalent theme throughout this work deals with the rationalization of political authority as a function of the distribution of institutional power throughout the system. Depending on one's perspective, "one can thus define political modernization to mean either the concentration of power, the expansion of power, or the dispersion of power."[5]

Robert A. Dahl's *Polyarchy: Participation and Opposition* builds upon Huntington's theoretical model of institutional roles and structure in transforming and modernizing societies. His expansion utilizes a systematic approach and method of in-depth subjective analysis combined with an objective diagnosis of optimal internal conditions for the creation of social polyarchies (pluralistic regimes types) that directly contrast with hegemonic regime types (social diversity). In conjunction with Huntington's analysis of the distribution of institutional power, Dahl takes the concepts of power and function a step further by refining the interpretation of concentration and dispersion to mean the political monopolization versus competition for political resources, knowledge, and skills by both state and society. In terms of toleration or repression of society by the state:

> The key resources that governments use to suppress oppositions are of two broad types: violent means of coercion, persuasion, and inducement, typically wielded by military and police forces; and nonviolent means of coercion, persuasion and inducement, or as they will be called here, socioeconomic sanctions, chiefly in the form of control over economic resources, means of communication, and processes of education and political socialization.[6]

5. Ibid., 145.

6. Robert A. Dahl, *Polyarchy: Participation and Opposition* (New Haven: Yale University Press, 1971), 48–49.

Furthermore, he also prescribes two guiding principles or axioms that establish the utilitarian value of institutionalizing toleration or repression, by describing how such political resources provide leverage to preserve socioeconomic order and control:

> Axiom [1]: The likelihood that a government will tolerate an opposition increases as the resources available to the government for suppression decline relative to the resources of an opposition.[7]

> Axiom [2]: The likelihood that a government will tolerate an opposition increases with a reduction in the capacity of the government to use violence or socioeconomic sanctions to suppress an opposition.[8]

This qualitative literature thus serves to illuminate the complex character of the convergence of dynamical forces of society with structural forces of polity, reminding us that these forces of revolutionary change function both as an impetus of modernization, and also as a catalyst driving the transformation of social and state systems of governance.

Classical scholars and theorists such as Parsons, Huntington, and Dahl developed the theoretical framework of comparative political sociology in an attempt to capture essential causal relationships underlying the conditions of systemic change. However, while their models have generated key insights, their qualitative analyses of contextual and behavioral variables fall short of quantitatively depicting a precise picture of the temporal and spatial dimensions of the process.[9] Still, their contributions have paved the way for contemporary scholars and theorists to build on their models, thus bridging a significant gap between theory and data.

This modernization and development perspective has formed the foundation for several important quantitative empirical studies of state capacity and governance. Hegre, Ellingsen, Gates, and Gleditsch develop an empirical model by conducting a multivariate

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7. Ibid., 48.

8. Ibid., 49.

9. Concerning exposure of this empirical gap and data deficit, Almond and Verba highlight that "the development of statistical analysis [has] made it increasingly possible to establish the patterns of interaction among attitudes, the relations of social-structural and demographic variables to attitude variables, and the relations of attitude variables to social and political behavior." For more on the historical advancement of research design and methodology, see Gabriel A. Almond and Sidney Verba, eds., *The Civic Culture Revisited*, 4th ed. (Toronto: Little, Brown and Company, 1980), 15.

regression analysis to determine the statistical significance and magnitude of the causal relationship between the level of democracy and political change; and how susceptible certain regime types are to civil war or conflict.[10] Their study focuses on the time-effects that political change has on intermediate regimes or semidemocracies that fall within or between the broad spectrum of democracy and autocracy.[11]

In their quantitative study of preferences versus grievances, Collier and Hoeffler develop two distinct econometric models to determine whether the initiation of civil war results from a conditional series of opportunities presenting participants either financial payoffs and tradeoffs (greed), or whether the initiation is caused by personal motivations (grievances). Their main empirical model is premised on "economic accounts which explain rebellion in terms of opportunity: it is the circumstances in which people are able to rebel that are rare."[12] The frequency of rebellion, including occurrences of civil war, is regressed against three quantitative explanatory variables that finance such domestic conflict. In their first model, Collier and Hoeffler "consider three common sources: extortion of natural resources, donations from diasporas, and subventions from hostile governments."[13] Their second model utilizes "four objective measures of grievance: ethnic or religious hatred, political repression, political exclusion, and economic inequality."[14] Comparing these two sets of results Collier and Hoeffler conclude that the

10. One of the key contradictions of political change and the democratization process that they highlight is that: "Repression leads to grievances that induce groups to take action, and openness allows for them to organize and engage in activities against the regime." For more on this claim, see Håvard Hegre, Tanja Ellingsen, Scott Gates, and Nils Petter Gleditsch, "Toward a Democratic Civil Peace? Democracy, Political Change, and Civil War, 1816–1992," *The American Political Science Review* 95, no. 1 (March 2001): 33.

11. Hegre, Ellingsen, Gates, and Gleditsch conclude in their empirical findings that "intermediate regimes are most prone to civil war, even when they have had time to stabilize from a regime change. In the long run, since intermediate regimes are less stable than autocracies, which in turn are less stable than democracies, durable democracy is the most probable end-point of the democratization process." See Hegre, Ellingsen, Gates, and Gleditsch, "Toward a Democratic Civil Peace?," 33.

12. This empirical study analyzes conflict through a different prism taking a unique approach to measuring rationalization of preferences and grievances by opportunistic rebel factions or insurgents assuming they would assess payoffs and tradeoffs for engaging in civil war with the state symbolizing the object of value. See Paul Collier and Anke Hoeffler, "Greed and Grievance in Civil War," *Oxford Economic Papers* 56 (2004): 563.

13. Ibid., 565.

14. Ibid., 570.

material elements of state capacity matter more than grievances in explaining the outbreak of conflict.

Building on this literature, Thies expands beyond the premise that rebels and insurgents (individually or collectively) simply ignite the spark of civil war, and inflame the passions of the domestic populace with the aim of seizing a plentiful bounty of resources and consolidated power held in trust by the state. Previous quantitative studies have modeled civil war utilizing econometrics, and attempt to demonstrate the rationality of behavior over time. Such analyses conventionally prop state actors against non-state actors, and assume both competitors are striving to maximize preferences in order to yield a political profit. Thies takes a different approach and utilizes a methodology that serves as one of the main blueprints for the research design of this study.[15] At the conclusion of estimating and simulating the model, his empirical findings suggest: "First, state capacity does not significantly affect the onset of civil war, while the onset of civil war significantly reduces state capacity."[16] Second, "with the exception of the oil exporter dummy variable, primary commodities play no direct role in civil war onset."[17] Instead, "primary commodities work their direct effects on state capacity."[18]

This quantitative literature has taken great strides forward in quantifying the conditions necessary for effective governance, and measuring optimal or desired levels of state capacity. However, a theoretical as well as an empirical gap remains. Most of these contemporary studies place heavy emphasis on the role of material resources, revenues, and key commodities in igniting political change or conflict. *This thesis will instead explain the impact of social connectivity on state capacity.* What differentiates this study from its predecessors is thus a shift in emphasis from material resources and revenues to the intangible effect of intellectual resources, along with the associated cognitive tools

15. According to Thies, "primary commodities are a natural source of revenue for both rulers and rebels, thus they are a useful focal point to study the relationship between state capacity and civil war onset." For more on his methodology and model development, see Cameron G. Thies, "Of Rulers, Rebels, and Revenue: State Capacity, Civil War Onset, and Primary Commodities," *SAGE Journal of Peace Research* 47, no. 3 (2010): 321.

16. Ibid., 321.

17. Ibid., 321.

18. Ibid., 321.

generated by ICT, on state structures and social systems, as the world collectively progresses into the 21st century and well beyond.

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III. SYNTHESIS OF A THEORETICAL FRAMEWORK

In T. Camber Warren's *Not by the Sword Alone: Soft Power, Mass Media, and the Production of State Sovereignty*, he takes a unique approach in his study to observe through a different analytical lens the popular paradigm of domestic civil war and conflict. Warren posits that: "Mass communication technologies thus make it possible for a mass audience to be addressed *collectively*, thereby offering a nation 'an image of itself…as knowable community.'"[19] As highlighted earlier, Collier and Hoeffler along with Thies observe this paradigm through the lens of rationality in terms of maximizing the utilitarian value of materiel in order to seize an opportunity or capitalize on a profit margin. Warren contradicts these hypotheses by postulating that political change has less to do with the rationality of choice and more to do with the construction of thoughts, perceptions, and symbols that forge a common identity. His theory builds on the expectation that "we should expect that mass media technologies will strengthen economies of scale in the production of normative influence."[20]

Not by the Sword Alone marks a significant shift from the previous literature centered on rationality, to mass media communication technologies that produce or generate belief systems. It also marks a symbolic shift from the industrial age characterized by production and hierarchy of interests to an age of globalism characterized by expression and autonomy of ideas. Although his study marks a paradigm shift, it centers on traditional means and modes of communication, including connectivity. Warren illuminates this focal point by saying: "In other words, as has been shown repeatedly in experimental work in social psychology, political messages tend to achieve greater normative impacts when they are perceived to have been more widely disseminated. Indeed, this is precisely why mass media technologies—such as newspapers, radios, and televisions—represent such powerful vehicles for normative

19. T. Camber Warren, "Not by the Sword Alone: Soft Power, Mass Media, and the Production of State Sovereignty," forthcoming *International Organization* (2012–2013): 15.

20. Ibid., 16.

influence."[21] It is imperative not to overlook or be dismissive of "old" media and its immense contributions to the development of collective identities that advance stability in times of civil war or conflict; but consideration of "new" media animated by ICT is also necessary.

Robert A. Saunders' *Ethnopolitics in Cyberspace: The Internet, Minority Nationalism, and the Web of Identity* exposes and narrows a theoretical deficit, dealing with the impact of ICT on institutions of power as our world progresses into a globalized 21st century. As Saskia Sassen contextually frames it in Saunders' book, "Digital space, whether public or private, is partly embedded in actual societal structures and power dynamics: its topography weaves in and out of non-electronic space."[22] As the proliferation of ICT continues to narrow the social connectivity gap at breakneck speed, what are the implications and consequences of accelerating the rate of change in state capacity? Saunders offers the following explanation with regard to the social phenomenon of the Internet effect:

> All states have suffered a diminution of both internal and external authority in the face of the pressures of the global communications revolution, brought about by the magic combination of telephones, orbiting satellites, and computer. The overlapping webs of human activities which have resulted have served to erode the spiritual and practical bases upon which the nation state was predicated.[23]

Moreover, how does it affect the process of monopolization of or competition for political resources in order to effectively impose governance? *The decrease in expected value and increase in cost of violent means of coercion generated by the proliferation of information communication and technologies (ICT) disintegrate structural bounds of political order; in addition to accelerating the process of dissolving the connective tissue of the greater social system that fuses the state to society*.

21. Ibid., 15–16.

22. Robert A. Saunders, *Ethnopolitics in Cyberspace: The Internet, Minority Nationalism, and the Web of Identity* (New York: Lexington Books, 2011), 57.

23. Ibid., 56–57.

The convergence of dynamic social forces with structural forces of governance functions as a catalyst for transforming and modernizing institutions of power. However, in the process of reviewing recent theoretical literature on the subject, a significant gap in the literature is exposed that has yet to explain the impact modern ICTs of the 21st century have had on such institutions. Such modern technology has increasingly accelerated both the rate of socioeconomic development and political change. Expansive participation, aggressive competition, and rapid mobilization are currently transforming both state and society from a clustered mass to a constellation of bits.

Saunders gives an important perspective as he expands the scope of this theoretical analysis from "old" source-based media organized around print, audio, and audio-visual to "new" social media oriented around digital network technology. The Internet effect has provoked *rapid* as opposed to *gradual* modernization along with the transformation of traditional state and social structures generated by ICT. This sort of revolutionary change ripens the conditions to create as well as escalate future political crises and social shocks that can destabilize the system. The implication of such crises and shocks is a disruption in the ability of the state to legitimate its purpose and to control all various facets or dimensions of society by imposing its will on citizens of the state. This disruption leads to degradation of the government's capacity to realize its full potential to consolidate state power, rationalize political authority, and appropriate social relationships.[24] Furthermore, contributing to this degradation in capacity, an increase in the level of connectivity of digital social networks weakens rather than strengthens traditional control mechanisms of the state apparatus.

The institutional arrangements and bureaucratic organizations that compose the state apparatus are designed to reinforce cleavages within the greater social system. These crosscutting cleavages are reinforced by the state to politically define subcultures

24. Max Weber's methodical approach to designing a theoretical model captures the essence (and nuances) of systemic behavior as well as dynamic variables that formulate rational ideal types categorizing complex institutional arrangements and associated bureaucratic organizations; for more on the concepts that formulate his model, see Max Weber, *The Theory of Social and Economic Organization*, eds. and trans. A.M. Henderson and Talcott Parsons (New York: The Free Press, 1947).

that carve society along ethnic, religious, linguistic, and geospatial partisan lines.[25] Such rigid lines serve efficiently to manage levels of political participation and social competition that can potentially spark combustible, socially active movements or inflame the passions of the citizenry.

The essence of subcultures embodies the cultivation process of routinized behavior and habitual social relationships. They grow normative influence in addition to branding an established set of normative standards that are formulated and implemented through the processes of socialization, education, and professional specialization.[26] Hence, a disruption in the status quo of such arrangements can trigger a political crisis of legitimacy. Lipset points this out clearly articulating that:

> A crisis of legitimacy is a crisis of change. Therefore, its roots must be sought in the character of change in modern society. Crises of legitimacy occur during a transition to a new social structure, *if* (1) the *status* of major conservative institutions is threatened during a period of structural change; (2) all the major groups in the society do not have access to the political system in the transitional period, or at least as soon as they develop political demands. After a new social structure is established, in the new system is unable to sustain the expectations of major groups (on the grounds of "effectiveness") for a long enough period to develop legitimacy upon the new basis, a new crisis may develop.[27]

Thus, the inhibition or inability to legitimate the purpose and cause for conservative institutions and bureaucracies to exist can compel a change in systemic behavior and structure of the greater social system.

This fundamental change in behavior and structure that is being stimulated by ICT ventures beyond the engineering of cleavages and culture. Facilitated and empowered by these sophisticated technologies, the accelerated rate times the pace of participation, competition, and mobilization of individual ideas in the form of self-expression combined

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25. See Chapter 17 on subcultures, cleavage patterns, and governmental effectiveness in Dahl, *Polyarchy*, 105–123.

26. For more insight on conceptual blocks and perceptual stereotypes that inhibit creativity and cognitive behavior, see James L. Adams, *Conceptual Blockbusting: A Guide to Better Ideas*, 4th ed. (New York: Basic Books, 2001), 8.

27. Seymour Martin Lipset, *Political Man: The Social Bases of Politics* (Garden City, NY: Doubleday & Company, Inc., 1960), 78.

with a collective conscious is exponentially forging multiple webs of digital social networks. These networks are currently diluting or diminishing, while simultaneously perforating these rigid lines of governance. Furthermore, they are also transforming them into more porous ones, thus making the structure more transparent and observable well beyond contiguous borders.[28]

As the strength of these lines of cleavage diminish, the central nervous system is exposed—the system of beliefs comprised of ideals, values, and common operating principles. This central nervous system formulates as well as harnesses the collective identity of both state and citizenry. Most importantly, it serves to cultivate the state's ideological worldview and shape an ontological reality. Dahl presciently emphasizes that: "Any dispute in which a large section of the population of a country feels that its way of life or its highest values are severely menaced by another segment of the population creates a crisis in a competitive system."[29] Such innovative ICT amplifying the frequency and intensity of future political crises and social shocks is suggestive of a surfacing revolution. Samuel P. Huntington suggested that: "Revolution is the extreme case of the explosion of political participation."[30]

One of Huntington's famous maxims is that: "Revolution is the ultimate expression of the modernizing outlook, the belief that it is within the power of man to control and to change his environment and that he has not only the ability but the right to do so."[31] As the twilight of 20th century industrialism has given way to the dawn of 21st century globalism, many strategists and polemicists suggest that another revolution is on the horizon—the conceptualization in data bytes expressed by the Information

28. Cleavages continue to demarcate the foundational cornerstones of social diversity in regimes to this day. As a cautionary note, the implications consequential to the thinning of these well-established lines by ICT that delineate social structures and political institutions could potentially disintegrate over time. This may yield greater cultural plurality, especially in democratically oriented regimes. This could set in motion conditions that may polarize then gridlock both the state and society. Consequentially, such conditions could give rise to more conflict and less cohesion. According to Dahl, "Obviously any system is in peril if it becomes polarized into several highly antagonistic groups. Confronted by severe polarization, competitive regimes are prone to collapse, to a coup d'état, to civil war." See Dahl, *Polyarchy*, 105.

29. Dahl, *Polyarchy*, 105.

30. Huntington, *Political Order in Changing Societies*, 266.

31. Ibid., 265.

Revolution. The genesis of the Internet effect that continues fueling the explosion of ICT has enduring implications. It has sparked the long fuse of an Information Revolution and a Social Network Revolution that cannot be easily managed by liberal democracies or extinguished by authoritarian dictatorships.

Another qualitative maxim Huntington posed concerning such phenomena is that: "The measure of how revolutionary a revolution is is the rapidity and the scope of expansion of political participation."[32] The first two decades of this century have been marked by the melding of man, mind, and ICT into a series of dynamic social networks that are both endogenous as well as exogenous to social and political systems. Individual as well as collective citizens of the state now possess literally in the palm of one's hand the cognitive tools and resources to exercise with little restraint actual and potential power to effectuate the mass mobilization of people. This is accomplished with the touch of a screen or the click of a button or push of a mouse by distributing and disseminating intellectual resources worldwide via the Internet.

This revolutionary wave is fundamentally altering both the structure of institutional arrangements and the behavior of bureaucratic organizations by transforming traditional tactics to organize, communicate, collaborate, and participate in the political system. Does the accelerated rate of systemic change resultant of the Internet effect create social cohesion, or cleavage that further leads to increased conflict? The underlying theme that is interwoven throughout this thesis is to assess the implications and potential consequences of the role of modern ICT in empowering global mass participation as well and political contestation[33]; and to ascertain whether the system is approaching or approximating an upper limit in terms of state capacity.

The central concept, as previously mentioned, is that with every new technology, a new political sociology is created and perpetuated *in size and scope*. This idea is not a

32. Ibid., 266.

33. According to Dahl, "The lower the barriers to public contestation and the greater the proportion of the population included in the political system, the more difficult it is for the government of a country to adopt and enforce policies that require the application of extreme sanction against more than a small percentage of the population." The application of extreme sanction implies the conduct of violence via administration or coercion. See Dahl, *Polyarchy*, 27.

recent phenomenon corresponding with the introduction or implementation of new, innovative technologies such as the printing press or the iPhone. In *Political Man: The Social Bases of Politics*, Seymour Martin Lipset postulated well before the advent of the Internet that:

> To the extent that the lower strata have been brought into the electoral process gradually (through increased organization, and upgrading of the educational system, and a growth in their understanding of the relevance of government action to their interests) increased participation is undoubtedly a good thing for democracy. It is only when a major crisis or an effective authoritarian movement suddenly pulls the normally disaffected habitual nonvoters into the political area that the system is threatened. Thus neither high nor low rates of participation and voting are in themselves good or bad for democracy; the extent and nature of that participation reflect other factors which determine far more decisively the system's chances to develop or survive. But the extent of apathy and the varying levels of participation of different segments of the population do clarify the underlying consensus and conflict within the political process.[34]

State capacity is a function of either political activity or political apathy. Catalyzed by ICT, social connectivity is enabling individual and collective self-expression. As previously posited—and important to reemphasize—this collaboration is performed consciously within a web of social networks armed with the cognitive resources and tools to actively participate, oppose, and contest the traditional political order. More importantly, it is confronted with the challenges and exigencies of ever increasing dynamic complexities and pressures imposed on these systems to assimilate as well as accommodate new social strata. Hence, social connectivity may potentially be a forcing dysfunction that may threaten the state's ability to effectively and efficiently govern.

As intense participation and interactive collaboration levied en masse by modern ICT is compelling the political system to accelerate the process of assimilation and accommodation of this influential 21st century digital strata, it is concurrently inhibiting the progressive process of consolidating state power and rationalizing political authority. These elemental functions justify its purpose as well as its cause: to efficiently impose

34. Lipset, *Political Man*, 219.

effective governance on the greater social system (by traditional means of administration or coercion). Hegre, Ellingsen, Gates, Gleditsch stress in one of their prime concepts that:

> Theoretically, consolidation can occur anywhere on the autocracy-democracy spectrum. Those at either extreme can be consolidated or unconsolidated. Consolidated autocracies exhibit self-enforcing rules and institutions that prevent protest and other activities aimed against the state. Semidemocracies [characteristic of oligarchies or hegemonies] also may become consolidated.[35]

The autocracy-democracy spectrum conceptualized by Hegre, Ellingsen, Gates, and Gleditsch is an excellent point of origin from which to define as well as explain the complex dynamics underlying the processes of democratization and autocratization that appear to ripen the conditions for political change and conflict. However, at this juncture, it is necessary to separate these main concepts and analyze the causal relationships along this spectrum.

The initial hypothesis of this study purports that a bifurcation of divergent regime type behavior takes place over time between liberal democracies and authoritarian dictatorships. The hypothesis proposes that there exists a conditional causal relationship associated with the ability to maximize efficient state capacity and effective governance, and the degree to which states are connected to the Internet over time. More specifically, it is purported that regimes oriented toward democracy would—in theory—experience a *nominal* or *marginal* growth in state capacity and governance. Conversely, regimes oriented towards autocracy would—also in theory—experience an *exponential* decay in state capacity and governance. Why? Although this study is not to be dismissive of certain regime types oriented toward democracy, the focus of the analytical lens is to concentrate theory on regime types oriented toward autocracy.

The degradation or decay of efficient state capacity along with effective governance is a function of the orientation of the state structure, and the connection of the particular regime to its system of belief and values that define its reality. It is noteworthy to emphasize that: “Autocratic countries do not become mature consolidated democracies

35. Hegre, Ellingsen, Gates, and Gleditsch, “Toward a Democratic Civil Peace?,” 34.

overnight."[36] Authoritarian dictatorships or autocracies oriented toward this side of this spectrum display a propensity to become more structurally ossified when confronted head on with the dilemma of high levels of social connectivity to the Internet. Social connectivity naturally induces rapid or accelerated rates political change that would potentially create a social shock or present a political crisis to the system.

Hence, a predictable response from the regime would be to exercise greater control by hardening the institutions of power and bureaucratizing the political order as a strategy to prevent the draining away of political power which could ultimately threaten the legitimacy of the incumbent. Concerning the power and legitimacy of an autocratic regime:

> Political institutions also can be deconsolidated. Political change, whether in the form of democratization or autocratization, can create instability. The loss of legitimacy by the regime induces dissatisfied groups to struggle against it. If the direction of change is toward autocracy, the deconsolidation of political institutions, also implies increased repression. Repression by a regime without well-developed political institutions is likely to promote civil violence.[37]

Thus, it is particularly difficult and challenging for autocratically oriented regime types to allow or accept an open watershed of social connectivity throughout the state. Consequently, ossification of the regime compels the state to concentrate its efforts on reinforcing and maintaining structure through existing cultural, administrative, and coercive mechanisms.

What about liberal democracies? Do these regime types oriented toward this side of this spectrum display a propensity to become less structurally ossified and more open when confronted head on with the dilemma of high levels of social connectivity to the Internet? It seems plausible that regimes oriented toward the democratic process display a certain propensity to better absorb rather than deflect social shocks to, or political crises within, the system. Liberal democracies thus demonstrate a propensity toward being more oscillatory in nature, as opposed to becoming ossified, while also tending to be more

36. Ibid., 34.

37. Ibid., 34.

tolerant of different social strata and less repressive toward them (especially over time). Hegre, Ellingsen, Gates, and Gleditsch posit that: "In the case of democratization, new and more open institutions take root and promote a peaceful resolution of domestic conflict. As time passes, these become more entrenched, and the likelihood of regime failure decreases."[38]

Democratic regimes tend to derive their source of power from the wellspring of their legitimacy—the connection to their system of belief and values that defines their ontological reality. Rather than struggling to control every situation or condition, progressive democracies develop a series of processes that cope with the dynamic complexities of sophisticated ICT and the Internet. Like all regime types, their essence is about striving to attain dynamic equilibrium, and the challenge in liberal democracies to strike a balance between liberty, equality, privacy, prosperity, and security.

At the same time, democracies are somewhat paradoxical in that there appears to be an inherent contradiction to the conceptual ideal of democracy, and what it symbolically represents to a majority of people. Hegre, Ellingsen, Gates, and Gleditsch note that political change is continuous and somewhat constant for both state and society, and both continually develop and progress over time. Coining the phrase semidemocracies in their case study, they provide the following cautionary note: "Semidemocracies are partly open, yet somewhat repressive, a combination that invites protest, rebellion, and civil violence. Repression leads to grievances that induce groups to take action, and openness allows for them to organize and engage in activities against the regime."[39] During this enduring and cyclical process, even the most tolerant and most open form of liberal democracy is, to a certain extent, repressive.

The previous sections synthesized a series of conceptions that undergird the central hypotheses of this study. However, this framework now needs to be filled with a data structure, in order to corroborate the proposed causal relationship, with the aim of further narrowing the empirical gap that currently exists within this literature.

38. Ibid., 34.

39. Ibid., 33.

IV. METHODOLOGY AND EMPIRICAL DATA

The previous section covered synthesis of the theoretical framework. It provided the structural dimensions to the essential concepts and ideas behind an emergent causal relationship between state capacity and social connectivity. Now it is important to shift emphasis from theory to data, and analyze statistical data and groups of observation over a finite time period. The intent is to test with quantitative data whether these loose assumptions or broad generalizations are actually substantiated by evidence.

This section serves to define our measurements for both the response (dependent) variable of state capacity as well as the explanatory (independent) variables—including social connectivity—within a *time-series cross-sectional model.* This approach utilizes multivariate linear regression to develop the main empirical model, and to formulate alternate versions used to test for model robustness. The aim of conducting this regression analysis is to apply the explanatory and predicting power of the main model to estimate this central causal relationship, and to determine how this relationship influences the performance of certain regime types over time.[40]

The regime types of a particular state over time is derived from a dataset that compiles data from 1800 thru 2011 of regime types spanning from liberal democracies to authoritarian dictatorships that is maintained by the *Polity IV Project*.[41] This panel of observations is measured utilizing a cardinal scale known as a 'Polity Score.' It is a scale that "captures this regime authority spectrum on a 21-point scale ranging from -10

40. According to Yaffee, panel data analysis "endows regression analysis with both a spatial and temporal dimension. 'The spatial dimension pertains to a set of cross-sectional units of observation.' 'The temporal dimension pertains to periodic observations of a set of variables characterizing these cross-sectional units over a particular time span.'" For more on the utility and applicability of this method of analysis, see Robert A. Yaffee, "A Primer for Panel Data Analysis," eds. Kate Monahan and Jill Hochberg, *Connect: Information Technology at NYU* (Fall 2003): 1–14.

41. The Polity IV dataset "covers all major, independent states in the global system (i.e., states with total population of 500,000 or more in the most recent year; currently 166 countries) over the period 1800–2011." For a more detailed synopsis, see Monty G. Marshall, Keith Jaggers, and Ted Robert Gurr, eds., *Polity IV Project: Political Regime Characteristics and Transitions, 1800–2010,*" Updated dataset version 2012 (Vienna, VA: Center for Systemic Peace, 2011).

(hereditary monarchy) to +10 (consolidated democracy)."[42] Our explanatory variable, ***Democracy***, transforms this scale to a range from 0 to 20.

Our statistical model covers a 20-year time period, ranging from 1990 to 2010 (with all independent variables lagged by one year to mitigate the potential of reverse causality). This period covers the nascent development of the Internet plus rapid expansion of social connectivity and digital media. Also, these two decades mark a symbolic transition from 20th century industrialism to 21st century globalism. More importantly, a 20-year time period ensures a sizeable testing space for running the multivariate regression analysis.

The dependent variable that comprises the measurement proxy of state capacity is the relative political extraction of taxable revenue, commensurate with gross domestic product (GDP). Our response variable, ***Capacity***, measures a state's ability to realize its full potential to extract taxable revenue from its population. The data, measured data from 1960 thru 2007, is drawn from the edited case study *Performance of Nations*.[43]

The independent variable that comprises the proxy of social connectivity is the log of individual access to the Internet. By definition, our explanatory variable, ***Internet***, is the ratio of individuals proportionate to the total population of society that can access the Internet. The dataset that compiles data on variables measuring social connectivity and digital media is maintained by the *International Telecommunications Union*.[44] To account for the possibility of a conditional causal relationship, our models will also include a multiplicative interaction term, ***Internet x Democracy*** as a key variable.

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42. Ibid.

43. Relative political extraction measures "the ability of a government to obtain resources from a population given their level of economic development. Efficient governments are able to meet or exceed their extractive capabilities while insufficient governments fail to reach expected extraction levels." For a detailed explanation of this dataset on relative political capacity and socioeconomic development, see Ronald Tammen and Jacek Kugler, eds., *Performance of Nations* (Landham, MD: Rowman & Littlefield, 2012).

44. International Telecommunications Union (ITU) collects "information communications technology statistics and datasets for 200 economies and over 100 indicators such as Internet usage and mobile-broadband networks." Of these indicators, the primary focus will be on collecting/analyzing data concerning individual access to the Internet; for more detailed information, see *International Telecommunications Union: Dataset on Social Media Connectivity* (Geneva: International Telecommunications Union, 2012).

The dynamic interrelationship between social connectivity and regime type is a key nexus of this study. This relationship is to be examined by conducting a statistical analysis to estimate the conditions under which states achieve greater capacities to extract taxable revenue resources from their societies. More specifically, it is utilized to evaluate if the efficacy of governance is facilitated or frustrated due to increases in Internet access by populations within either liberal democracies or authoritarian dictatorships.

In conjunction with both dependent and independent variables, control variables must be included in this analysis and explained in further detail. The six common control variables influencing socioeconomic development and regime modernization identified to narrow this empirical gap are: (1) ***Wealth*** (2) demographic diversity (***Diversity***) (3) religious diversity (***Religion***) (4) oil exporting states (***Oil***) (5) mountainous terrain (***Mountain***) and (6) population density (***Population***). The intent is to maximize reliability of the model, while minimizing bias in the results.

The concept of wealth is to be defined as Gross Domestic Product (GDP) Per Capita, which measures the level of socioeconomic development.[45] Accounting for the distribution and density of population[46] in conjunction with mountainous terrain[47] features of a non-contiguous spatial domain measures "the difficulties faced by governments seeking to control large populations across broad and difficult terrain."[48] Oil exporter is a "dichotomous indicator which equals 1 if a country derives at least one-third of its export revenues from fossil fuels."[49] Finally, ethnic fractionalization[50] and

45. Data measuring GDP per capita is derived from Alan Heston, Robert Summers, and Bettina Aten, eds., *Penn World Tables*, Updated dataset version 7.1 covering 1950–2010 (Philadelphia, PA: Center for International Comparisons of Production, Income, and Prices at the University of Pennsylvania, 2012); see also Warren, "Not by the Sword Alone," 21–22.

46. Data measuring population is also derived from Heston, Summers, and Aten, eds., *Penn World Tables*, Updated dataset version 7.1 covering 1950–2010.

47. Data measuring the percentage of mountainous terrain is sourced from Nicholas Sambanis, "What is Civil War? Conceptual and Empirical Complexities of an Operational Definition," *Journal of Conflict Resolution* 48, no. 6 (December 2004): 814–858.

48. Warren, "Not by the Sword Alone," 21.

49. Ibid., 21; data measuring oil exporting states also sourced from Sambanis, "What is Civil War?," 814–858.

50. Data measuring ethno-linguistic fractionalization (ELF) sourced from Sambanis, "What is Civil War?," 814–858.

religious fractionalization[51] are included to "control for the presence of pre-existing identity cleavages in the society."[52] The six aforementioned control variables are applied extensively in current empirical analyses covering not only socioeconomic development, but also civil war as well as sociocultural diversity.[53]

Our primary estimation technique utilizes ordinary least-square (OLS) regression with panel corrected standard errors. These methods are applied in conjunction with pairwise selection in order to best merge and align unbalanced panels or incomplete groups of observations within datasets.[54] Panel-corrected standard error enables conservative estimates of the variance of the model, accounting for the non-independence of observations within each country, in order to mitigate the possibility of overconfidence in the model's predictions.[55]

51. Data measuring ethno-religious fractionalization (ERF) sourced from Sambanis, "What is Civil War?," 814–858.

52. Warren, "Not by the Sword Alone," 22.

53. For more detailed empirical analyses and literature that takes an in-depth look into modeling the patterned processes of systemic behavior shaping conflict, crises, and culture, see Collier and Hoeffler, "Greed and Grievance in Civil War," 563–595; see also James D. Fearon, "Ethnic and Cultural Diversity by Country," *Journal of Economic Growth* 8 (2003): 195–222.

54. Cross-time panel-corrected standard error (**xtpcse** in *Stata*) "calculates panel-corrected standard error (PCSE) estimates for linear cross-sectional time-series models where the parameters are estimated by either Ordinary Least-Square (OLS) or Prais-Winsten [Feasible General Least-Square (FGLS)] regression. **xtpcse** assumes that the disturbances are, by default, heteroskedastic and contemporaneously correlated across panels." **Pairwise** (parity of observations and panel covariance) "specifies that, for each element in the covariance matrix, all available observations (periods) that are common to the two panels contributing to the covariance be used to compute the covariance." For an in-depth explanation of multivariate linear regression analysis with panel-corrected standard errors, see *Stata 11 Base Reference Manual* (College Station, TX: Stata Press, 2009), 372–383.

55. For a recommended detailed summation of Ordinary Least-Square (OLS) regression and its application to analysis of response and explanatory variables in determining a least-square fitted model, see G.D. Hutcheson, "Ordinary Least-Squares Regression," in *The SAGE Dictionary of Quantitative Management Research*, eds. L. Montinho and G.D. Hutcheson (2011): 224–228.

V. ANALYSIS OF EMPIRICAL DATA

The results for the main empirical model (Model 1), to include the five supplemental models testing for robustness can be observed in Table 1 located in the Appendix.

A. ESTIMATION OF STATISTICAL PARAMETERS

A sample population comprised of 2301 units of observation (country-years) collectively making up 140 groups (countries) of panel data was distilled into the initial baseline model. The dynamic variables were time lagged by one year in order to mitigate a chance of reverse causality. When observing the *p*-value column in the regression output summary, one notices that almost all variables (with the exception of wealth and oil exporting states) exhibit high significance levels of $p < 0.0001$. In other words, the statistical parameters derived from the data are generally estimated with a high level of precision. While oil income and economic development appear insignificant in this specification, this may be because these variables were already factored into Tammen and Kugler's model of relative political capacity of developed countries.[5657]

Further examining Model 1, one notices that social connectivity seems to negatively affect state capacity, thus solidifying the proposed claim of this study. Conversely, however, the interaction term between social connectivity and regime type appears to imply a key difference in how social connectivity operates within more or less democratically oriented regime types. This will be further discussed in detail as the scope of this process expands from the estimation process into the process of simulating

56. Tammen and Kugler's methodology for measuring political extraction is contingent upon three differentiated models "that have been tested to account for levels of extraction [dependent] upon the level of development of a country as well as its particular mix of resources. Developed and developing countries differ quite sharply based on differences in the structure of their economies and their patterns of tax collection." For a detailed description of their three baseline models, see Tammen and Kugler, eds., *Performance of Nations.*

57. As previously mentioned during the estimation process, the main concerns intrinsic to stochastic or dynamic modeling when dealing with pooled or panel data is addressing the conditions of serial or autocorrelation of error across periodic observations, heteroskedasticity of residuals, and multicollinearity of explanatory variables when considering the functionality and utility of the model. For a recommended diagnostic of potential problems inherent to data structures, see Jeffrey J. Harden, "Panel Data Analysis" (methods paper, University of North Carolina, June 29, 2009), 1–4.

predicted probabilities that systemically project the expected performance of states over time.

Before generating simulations of patterned processes of behavior, it is essential that robustness checks be conducted to ensure the initial results derived from the baseline model were not a random occurrence or anomaly. While this output suggests a well-fitted model and a high level of scientific confidence in its explanatory and predicting power, the results remain suspect until robustness checks are conducted against them. These checks will ensure that such highly significant *p*-values are not the result of arbitrary specification choices in the estimation process.[58]

B. ROBUSTNESS CHECKS

Five differentiated robustness checks for efficiency, expected bias, and consistency of results were conducted against the data, testing the foundational integrity of the baseline model. The first check removed relative political extraction of taxable revenue resources commensurate with *GDP*, and substituted it with an alternate response variable that measured relative political extraction commensurate with *agriculture* (developing countries oriented toward subsistence farming and/or commercial agriculture rather than market based economies).[59] As can be seen in Model 2, of all six models estimated, this alternate model version yielded equally high levels of statistical significance as those reported in Model 1.

The second as well as third check, respectively, adjusted the main model by incorporating longer time-effect lags. In both robustness checks, the GDP response variable was returned to the model as the dependent variable. The second model incorporated two-year time lags in the explanatory variables; the third model incorporated five-year time lags in its explanatory variables. As can be seen in Model 3

58. There are three potential types of [systematic] variance with this data: "Effects across units (across states), effects across time (variance across the years 1980–2009 for example), or effects within units (within states)." For more on structural problems and unit effects, see Harden, "Panel Data Analysis," 1–4.

59. For the least developed societies today, Tammen and Kugler posit that "agriculture as a control variable has proven to be a more accurate descriptor of the economic structure of societies. Over time as subsistence agriculture disappears, and populations become urban, income per capita is a more effective reflector of taxable productivity." See Tammen and Kugler, eds., *Performance of Nations*, which outlines the three proposed economic models of developed versus developing countries.

(Two-Year Time Lag) and also in Model 4 (Five-Year Time Lag), both alternate model versions yielded virtually the same levels of statistical significance and consistency in results.

The fourth check substituted the OLS regression estimator, and implemented a secondary estimation technique known as the Prais-Winsten feasible generalized least-square (FGLS) estimator.[60] This robustness check adjusted the model by allowing for first order autocorrelation of disturbances in periodic observations rather than contemporaneously correlated error.[61] As can be seen in Model 5, the implementation of FGLS in substitution of the OLS estimator still yielded highly significant results for the interaction term between social connectivity and regime type, in line with the previously reported result, though the statistical significance of the baseline regression coefficient for social connectivity is reduced to a *p*-value of 0.087 (see Model 5 in Table 1).

The fifth and final check on robustness utilizes a fixed-effects estimator. With this alternate model version, the control variables that are constant over time are omitted (see Model 6) because the model considers only cross-temporal variance. Again, almost all dynamic explanatory variables (with the exception of wealth and regime type) achieve a high significance level of $p < 0.0001$.

C. SIMULATION OF PREDICTED PROBABILITIES

The final stage of this multivariate linear regression analysis is a shift in emphasis from the *estimation* process of statistical parameters of interest to conducting the *simulation* process of generating estimated predicted probabilities. The primary

60. Beck and Katz note that: "Researchers who worry that their data may fall into one of the extreme cases of heteroscedasticity or contemporaneous correlation of the errors can check for these problems by examining the structure of the OLS residuals. Only if these problems are severe, and only if sample sizes are large enough, should researchers contemplate a more complicated FGLS estimation strategy. Those contemplating such a strategy must trade-off the potential advantages [accuracy] of FGLS against the disadvantages of inaccurate standard errors. We have not seen a TSCS [Time-Series Cross-Section] data set that makes it necessary even to consider this trade-off." For more on estimation strategies when conducting a multivariate linear regression analysis, see Nathaniel Beck and Jonathan N. Katz, "What to Do (and Not to Do) with Time-Series Cross-Section Data," *The American Political Science Review* 89, no. 3 (September 1995): 634–647.

61. *Stata* specifies that, "within panels, there is first-order autocorrelation AR(1) and that the coefficient of the AR(1) process is common to all the panels." See *Stata 11 Base Reference Manual* (College Station, TX: Stata Press, 2009), 373.

simulation technique to be used is derived from a supplemental software tool applied to *Stata* known as *Clarify*.[62]

The applied method runs an iterative process of 1000 simulations on the statistical parameters of interest that were originally calculated mathematically and expressed in the regression summary table of the baseline model. These simulations establish quantities of interest based upon setting specified values to particular explanatory/control variables, while holding all other variables constant at their mean values. The results from this iterative process of converting statistical parameters of interest into substantive quantities of interest can be observed in Table 7.

The simulations begin by setting the ***Democracy*** to a low value of 0 (0 signifies a low democracy level), then a medium value of 10, and finally a high value of 20, while simultaneously incrementing the logged value of ***Internet*** from -5 to +5. The predicted probabilities derived from this interaction between ***Internet*** and ***Democracy*** can be seen in Figure 1.

D. PROBABILITY OF A CONDITIONAL CAUSAL RELATIONSHIP:

Given these predicted probabilities, it seems likely that a causal relationship exists between the degree to which a society is connected via social media and digital communication networks (Internet and WWW), and the institutional capacity of state governance. Although the bifurcated results gleaned from this analysis indicate a conditional correlation between social connectivity and its influence on state capacity, the key unanswered question posed is: what is the magnitude of this causal relationship? In other words, to what degree does social connectivity influence governance at different levels of democracy?

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62. *Clarify* is a software tool "that uses 'Monte Carlo simulation to convert the raw output of statistical procedures into results that are of direct interest to researchers, without changing statistical assumptions or requiring new statistical models.' The main command prompt **estsimp** (estimates the model and simulates its parameters) applied by *Stata* 'estimates a variety of statistical models and generates M simulations of each parameter.' Each variable 'has M observations corresponding to the M simulations. **estsimp** labels the simulated variables and lists their names on the screen, so you can verify what was simulated.'" See Michael Tomz, Jason Wittenberg, and Gary King, *Clarify: Software for Interpreting and Presenting Statistical Results*, Software Versions 2.0 and Later (Cambridge, MA: Center for Basic Research in the Social Sciences at Harvard University, 2001).

This question was addressed by duplicating the simulation process described above, this time plotting the marginal effect of a shift from the 5th percentile to the 95th percentile of ***Internet***, at values of ***Democracy*** ranging from 0 to 20, with all other variables again held constant at their mean values. As can be seen in Figure 2, another linear graph was created to conduct a diagnostic assessment of the magnitude of the relationship and the degree of influence.

An analysis of the mean expected values of ***Capacity*** generated by this simulation demonstrates a diminishing marginal effect on state capacity that is correlated to upper medium and higher levels of ***Democracy***. The results indicate that a statistically significant negative relationship exists between ***Internet*** and ***Capacity*** in the presence of low levels of democracy, ranging from 0 to 10, and then a statistically significant positive relationship exists between ***Internet*** and ***Capacity*** in the presence of high levels of democracy, ranging from 19 to 20. Between these two ranges, the effect of social connectivity cannot be reliably differentiated from zero, as can be seen by the overlap of the 95% confidence interval with the 0 or null line[63] (see Figure 2). Thus, there appears to be a high probability of a strong causal relationship between state capacity and social connectivity, conditioned by the regime type.

63. This 0 or null line is linked directly to the Type 1 null hypothesis test indicating no causal relationship versus an alternate hypothesis test suggesting a causal relationship proportionate to a given rate of change—either in growth or decay—of regression coefficient values that is expressed in the baseline empirical model.

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VI. IMPLICATIONS AND PROJECTIONS

Our theoretical arguments coupled with empirical data provide significant evidence that establishes the probability of a strong corollary relationship between the levels of social connectivity to the Internet and the WWW and levels of state capacity. State capacity can be observed in terms of the state's ability to perform efficiently and impose effective governance on the citizens of the state within the greater social system. The autocracy-democracy spectrum as conceptualized by Hegre, Ellingsen, Gates, and Gleditsch is an excellent diagnostic tool that can be applied to best capture the theoretical assumptions and explain the dynamic complexities intrinsic to state capacity.[64] The degree or magnitude of this relationship is shown by the behavioral performance of authoritarian dictatorships versus liberal democracies over a 20-year time period ranging from 1990 to 2010. The aggregated panels of observed data estimated and simulated by the model reinforce our initial proposed claim. Our hypothesis suggests a high probability of a bifurcation of divergent behavioral performance commensurate with high, medium, and low levels of democracy. The simulation of predicted probabilities clearly exhibits this bifurcation shown in Figure 1 of the main model.

Due to constraints of time, the research design along with development of this baseline model aggregated and manipulated panels of data observing just one indicator—the Internet. However, based upon the statistical significance of the observable relationships generated by the baseline model, the robustness of initial results does indicate the future need or requirement to expand upon this model, and further increase its robustness. This would necessitate the aggregation of additional time-series cross-sectional panels that capture multiple explanatory variables such as mobile cellular phones, Facebook, Twitter, etc. An analysis of the statistical significance of this combination of multiple explanatory variables measuring social connectivity and digital communication platforms associated with ICT would boost the explanatory and predicting power of the empirical model. Furthermore, it would also better depict the

64. See Hegre, Ellingsen, Gates, and Gleditsch, "Toward a Democratic Civil Peace?," 33–48.

direction as well as magnitude of the causal relationship between state capacity and social connectivity over the same 20-year time period.

With that being said, the evidence of this causal relationship implies that while political change and conflict may alter the levels of state capacity, ICTs also accelerate the rate of political change and conflict. Although the effectiveness of governance is a function of the orientation and conditioning of particular regime types, social connectivity is a function of ICT. Sophisticated and innovative technologies may be regulated by a particular repressive regime, but they will almost never be eradicated. In other words, technology creates new political sociologies. Political order requires a campaign of effective strategies combined with sound policies to adapt to and cope with rapid changes to structures, functions, and roles accelerated by such modern technologies.

As globalism progressively drives our complex world at warp speed into the 21st century—and beyond—sophisticated modern technologies continue to exponentially increase the rates of social connectivity well beyond the cultures, societal cleavages, and contiguous geospatial boundaries of the current nation-state system. Hence, technology is testing the parameters or upper limits of state capacity. Established lines that delineate existing hierarchical structures and institutions could potentially disintegrate over time. This may yield greater cultural plurality, especially in advanced democratic regimes. However, in weak developing regimes, this could set in motion political conditions that may polarize then gridlock both the state and society, giving rise to more conflict and less cohesion. Either way, there is no going back: the ICT genie has been released from the bottle, and the acceleration of such dynamics is likely to continue. Moving forward, we must therefore carefully consider the development of tenable strategies and policies capable of adapting to rapidly changing technological innovations. Technology is a powerful tool created by the human dynamic, which manifests a latent paradox. In spite of this, the immeasurable power of the human spirit should never be underestimated. It shall persist.

APPENDIX

A. INTRODUCTION

This section contains the tabular data along with graphical representations that provide the design and structural framework of the comprehensive model. This statistical model provides an explanation of the concepts behind the conditional causal relationship between state capacity, and how it is affected by social connectivity. More importantly, it captures a conceptual snapshot of the systemic patterns of behavior and dynamic variables that influence governance.

B. REGRESSION RESULTS

Table 1 is a statistical summary of the multivariate regression results, showing regression coefficients in conjunction with their associated panel-corrected standard errors. The table presents the baseline model in the first column and then five alternate models testing for robustness.

Column1	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Internet	-0.0283***	-0.0287***	-0.0314***	-0.0414***	-0.0149*	-0.0231***
	(0.0052)	(0.0062)	(0.0055)	(0.0074)	(0.0087)	(0.0056)
Democracy	0.0141***	0.0137***	0.0147***	0.0167***	0.0046**	0.0021
	(0.0016)	(0.0015)	(0.0017)	(0.0019)	(0.0021)	(0.0019)
Internet x Democracy	0.0020***	0.0022***	0.0022***	0.0030***	0.0013**	0.0011***
	(0.0004)	(0.0004)	(0.0004)	(0.0004)	(0.0005)	(0.0003)
Population	-0.0395***	-0.0389***	-0.0405***	-0.0439***	-0.0196**	0.3060***
	(0.0049)	(0.0047)	(0.0051)	(0.0058)	(0.0094)	(0.0633)
Wealth	0.0087	-0.0310***	0.0090	0.0097	0.0390**	-0.0536
	(0.0068)	(0.0064)	(0.0072)	(0.0077)	(0.0196)	(0.0332)
Mountain	0.0171***	0.0155***	0.0177***	0.0199***	-0.0025	
	(0.0033)	(0.0033)	(0.0032)	(0.0031)	(0.0057)	
Oil	0.0059	0.0581***	0.0031	0.0002	-0.1352**	
	(0.0213)	(0.0221)	(0.0224)	(0.0218)	(0.0573)	
Diversity	0.1069***	0.1152***	0.1074***	0.1230***	0.2033***	
	(0.0203)	(0.0219)	(0.0213)	(0.0222)	(0.0510)	
Religion	-0.1768***	-0.0889***	-0.1837***	-0.1617***	-0.1706**	
	(0.0165)	(0.0181)	(0.0143)	(0.0146)	(0.0792)	
Constant	1.3096***	1.5974***	1.3148***	1.3153***	0.8714***	-3.6100***
	(0.1063)	(0.1037)	(0.1146)	(0.1318)	(0.3014)	(1.0730)
N	2301	2280	2176	1789	2301	2301

Note: Baseline model and robust standard errors are in parentheses; Asterisks denote levels of statistical significance:
*$p < 0.1$
**$p < 0.05$
***$p < 0.01$

Table 1. Statistical Summary of Regression Results

C. CONDITIONAL CAUSAL RELATIONSHIP

Figure 1 is a graphical depiction of the conditional causal relationship between the log of individual Internet access (social connectivity), and the mean estimated value of state capacity. This graph portrays the simulation of predicted probabilities, which predicts the simulated patterns of states with low, medium, and high levels of democracy, as estimated by the baseline model.

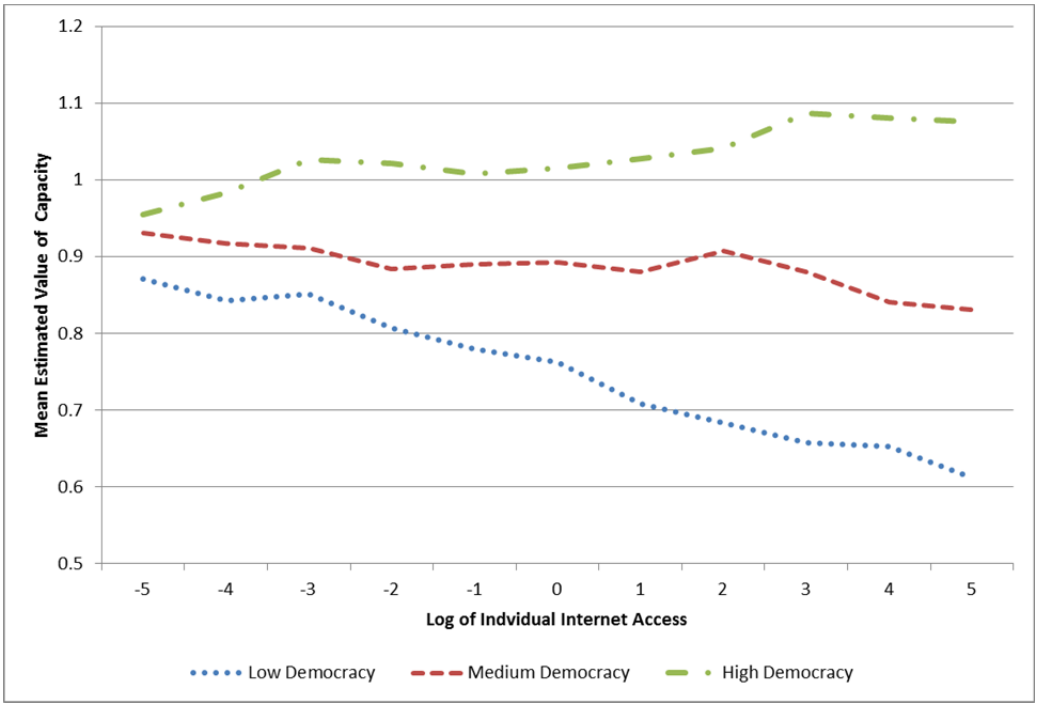

Figure 1. Simulation of Predicted Probabilities of the Baseline Model

D. MARGINAL EFFECT OF INTERNET

Figure 2 is a graphical representation of the marginal effect of Internet (social connectivity), showing its influence on state capacity at different levels of democracy. It provides a diagnostic assessment of the magnitude of the conditional causal relationship estimated by the statistical model.

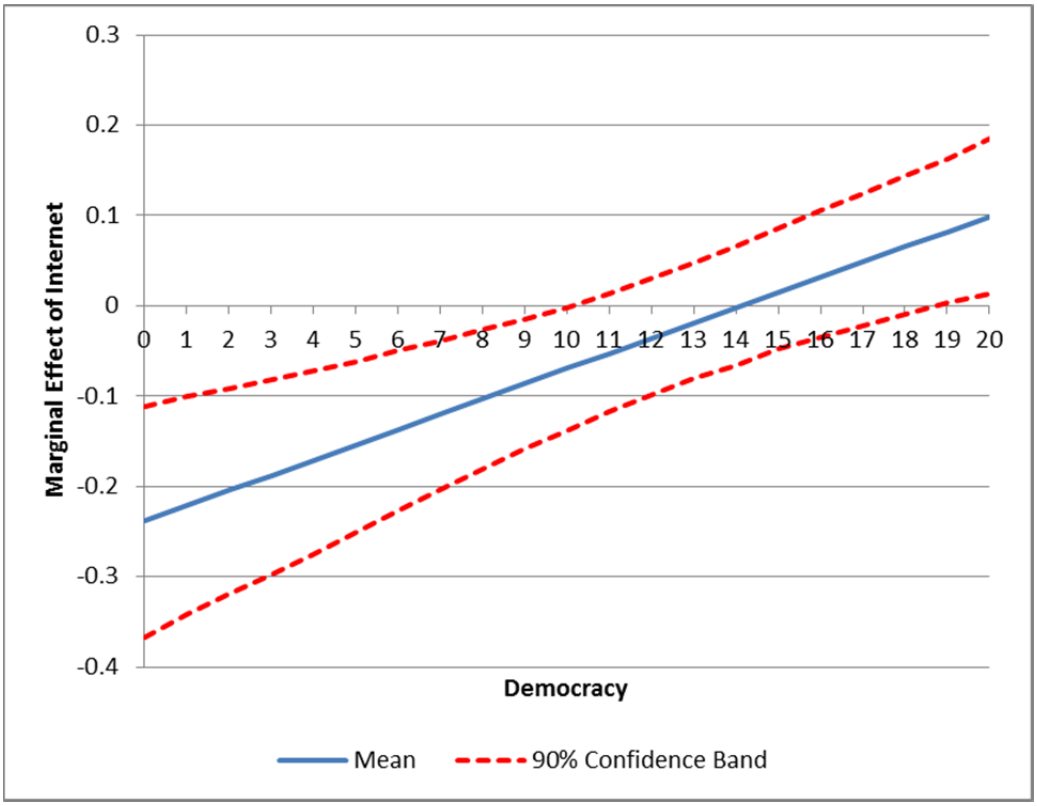

Figure 2. Simulation of Marginal Effects Measuring Direction and Magnitude

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